

S/N unknown

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Gabriel FESTOC Serial No.: unknown
Filed: concurrent herewith Docket No.: 8076.231USW1
Title: DEVICE FOR THERMO-DEPENDENT CHAIN REACTION
AMPLIFICATION OF TARGET NUCLEIC ACID SEQUENCES,
MEASURED IN REAL-TIME

CERTIFICATE UNDER 37 CFR 1.10

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By: 

Name: Chris Stordahl

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D. C. 20231

Dear Sir:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment:

IN THE SPECIFICATION

Amend the specification by inserting before the first line the sentence: "This application is a continuation of international application number PCT/ FR01/02385, filed July 20, 2001, pending."

IN THE CLAIMS

Please cancel claims 2-47. Please add claims 48- 97 as follows:

48. The cartridge of claim 1, wherein the diameter of the channels is 0.2 mm or less.
49. The cartridge of claim 1, wherein the capacity of the reservoir is in the range of 0.1 ml to 1 ml.
50. The cartridge of claim 1, which comprises 20 to 500 reaction chambers.

51. The cartridge of claim 1, wherein the volume of the reaction chambers is in the range of 0.2 μ l to 50 μ l.
52. The cartridge of claim 51, wherein the volume of the reaction chamber is in the range of 1 to 10 μ l.
53. The cartridge of claim 1, wherein the junction between the channels and the reservoir is formed at the periphery of the reservoir and the base of said reservoir is inclined and/or convex, to ensure distribution of a fluid contained in the reservoir to the channels.
54. The cartridge of claim 1, which has a geometry of revolution. In which the reservoir is placed substantially at the centre of said cartridge, the reaction chambers are distributed in a circle around said reservoir and the channels connecting said reservoir to said chambers are essentially radial.
55. The cartridge according to claim 54, in which the base of the reservoir is conical.
56. The cartridge of claim 54, in which the reaction chambers are placed at the periphery of said cartridge.
57. The cartridge of claim 54, with a diameter in the range of 1 to 10 cm.
58. The cartridge of claim 1, which has a translational geometry, in which the reservoir is placed on one side of said cartridge, the reaction cartridges are aligned on the other side of the cartridge, and the channels connecting the reservoir to said chambers are essentially parallel to each other.
59. The cartridge according to claim 58, in which the base of the reservoir is an inclined plane.
60. The cartridge or claim 1, in which the reservoir is divided into 2 to 8 sub-reservoirs, and each of the reaction chambers is connected to just one of said sub-resevoirs via a channel.
61. The cartridge if claim 1, in which the depth of the reaction chambers is in the range of 0.5 to 1.5 mm.
62. The cartridge of claim 1, characterized in that it is produced from a plastics material, preferably polycarbonate.
63. The cartridge of claim 1, the thickness of which is in the range of 0.5 to 5 mm.
64. The cartridge of claim 1, in which the floor of the reaction chambers is in the range of 0.05 to 0.5 thick.
65. The cartridge of claim 64, in which the floor of the reaction chambers is 0.25 mm thick.
66. The cartridge of claim 1, in which the reaction chambers are closed by an upper transparent wall.

67. The cartridge of claim 1, in which the reaction chambers are provided with vents .
68. The cartridge of claim 1, in which the reaction chambers are closed.
69. The cartridge of claim 1, in which the reservoir comprises an opening that can be adapted to means for adjusting the pressure in said reservoir.
70. The cartridge of claim 1, in which each channel is constituted by at least two portions with different diameters , the diameter of the second portion being less than that of the first portion , so as to create a pressure drop in the channel.
71. The cartridge of claim 1, wherein each channel is provided with an anti-reflux cavity at its junction with the reservoir , said anti-reflux cavity being constituted by a substantially vertical channel portion with a diameter that is equal to or greater than that of the channel .
72. The cartridge of claim 1, in which at least a portion of the reaction chambers comprises oligonucleotides.
73. The cartridge of claim 1, in which each reaction chamber comprises two primers specific for a nucleic acid sequence to be amplified and, optionally, a labelled probe specific for said sequence.
74. The cartridge of claim 1, in which at least a portion of the reaction chambers contains reagents that are deposited therein by depositing a liquid followed by drying, such that the arrival of a fluid in said reaction chambers takes said reagents up into solution again.
75. A device for carrying out enzymatic and/or molecular biological reactions requiring at least two different incubation temperatures, characterized in that it comprises:
- at least one cartridge having a plurality of reaction chambers and a reservoir, said reaction chambers being connected to the reservoir via channels ,
 - at least one heating plate having at least two distinct zones that can be heated to at least two different temperatures;
 - means for relative displacement between said cartridge and said plate, allowing a cyclic variation of the temperature of the reaction chambers.
76. The device of claim 75, in which the enzymatic reaction is a thermoderpendent chain amplification of nucleic acid sequences and in which the zones of the heating plate can be heated to at least two different temperatures, corresponding to phases in the nucleic acid amplification cycles.
77. The device of claim 76, wherein:
- primers specific for the target sequences to be amplified are predistributed in the reaction chambers;
 - the reservoir is intended to receive a fluid composed of a sample of nucleic acids to be analysed and the reagents required for a polymerase chain amplification reaction with the exception of primers;

- the heating plate has three distinct zones that can be heated to three different temperatures corresponding to the three phases of polymerase chain reaction amplification cycles.

78. The device of claim 76, for real-time thermodependent chain amplification of nucleic acid sequences, which comprises optical means for fluorescence excitation/measurement, disposed so as to excite and measure the fluorescence of the contents of the reaction chambers in each cycle.

79. The device of claim 76, in which the cartridge is a cartridge according to claim 1.

80. The device of claim 76, in which the distinct zones for heating the plate are distributed into at least two or three disk portions.

81. The device of claim 76, in which said heating plate is fixed and said cartridge is moved by means of displacement means .

82. The device of claim 76, in which said cartridge is fixed and said heating plate is moved by means of displacement means .

83. The device of claim 76, in which said displacement means cause rotation of said cartridge and/or said heating plate .

84. The device of claim 76, in which the cartridge is in direct contact with the heating plate .

85. The device of claim 76, in which the plate is provided with a coating encouraging relative displacement between said cartridge and said plate .

86. The device of claim 76, in which the heating plate comprises two or three distinct thermoblocks connected to means for programming their temperatures.

87. The device of claim 76, in which the bottom of the cartridge has a central projecting portion comprising a notch , and the displacement means include at least one driver co-operating with said notch to cause said cartridge to move in a rotary motion.

88. The device of claim 76, comprising optical means for fluorescence excitation/measurement disposed above or to the side of the cartridge.

89. The device of claim 76, further comprising means for supplying fluid present in the reservoir to the reaction chambers .

90. The device of claim 89, in which said supply means include a piston device , and the fluid is supplied to the reaction chambers by increasing the pressure.

91. The device of claim 89, in which said supply means include a pump and the fluid is supplied to the reaction chambers by reestablishing the pressure after establishing an underpressure.

92. The device of claim 91, in which the reaction chambers of the cartridge are closed.

REMARKS

Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Katherine M. Kowalchyk (Reg. No. 36,848), at 612.371.5311.

Respectfully submitted,

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Dated: October 15, 2001

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VERIFICATION OF TRANSLATION

I, Véronique MARCADÉ, hereby declare that:

My name and post office address are as stated below;

That I am knowledgeable in the French language in which the above identified international application was filed. That I have reviewed the English translation of the international application No. PCT/FR 01/02385 and that, to the best of my knowledge and belief, this translation is a true and complete translation of the above identified international application as filed, with the exception that I have only inserted the specific headings to conform to the US practice.

I hereby declare that all the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application issued thereon.

Date: October 11, 2001

Signature:



Full name of the translator: Véronique MARCADÉ

For and on behalf of

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